AMENDMENTS TO THE CLAIMS

This listing of the claims replaces all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. [Currently Amended] A method of modulating the E-field of an optical carrier signal, the method comprising steps of:

providing a Mach-Zehnder modulator having a pair of independently controllable branches;

deriving a pair of independent branch drive signals $V_L(t)$ and $V_R(t)$ based on a stream of successive digital sample values representative of In-phase and Quadrature components of a desired optical E-field; and

driving each branch with a respective one of the independent branch drive signals.

2. [Currently Amended] A method as claimed in claim 1, wherein the step of deriving the pair of independent branch drive signals $V_L(t)$ and $V_R(t)$ comprises steps of:

deriving respective phase and amplitude signal component values $V_\phi(n)$ and $V_S(n)$ based on the stream of successive digital sample values;

calculating corresponding drive signal values in accordance with:

$$V_L(t)=V_\phi(t)+V_S(t) \text{ and}$$

$$V_R(t)=V_\phi(t)-V_S(t).$$

3. [Previously Presented] A method as claimed in claim 2, wherein the step of deriving the phase and amplitude signal component values $V_\phi(n)$ and $V_S(n)$ comprises steps of:

calculating respective phase and amplitude values $\phi(n)$ and $S(n)$ of the desired optical E-field based on the stream of successive digital sample values;

scaling the calculated phase and amplitude values $\phi(n)$ and $S(n)$ to obtain respective scaled phase and amplitude values $\phi'(n)$ and $S'(n)$;

using a phase response of the MZ modulator to calculate the phase signal component value $V_{\phi}(n)$ required to produce the scaled phase value $\phi'(n)$; and

using an amplitude response of the MZ modulator to calculate the amplitude signal component value $V_S(n)$ required to produce the scaled amplitude value $S'(n)$.

4. [Original] A method as claimed in claim 3, wherein the step of scaling the calculated phase and amplitude values comprises a step of limiting the phase ϕ to a predetermined range of phase angles.

5. [Original] A method as claimed in claim 4, wherein the predetermined range of phase angles has a span of less than 180 degrees.

6. [Original] A method as claimed in claim 5, wherein the predetermined range of phase angles has a span of about 90 degrees.

7. [Original] A method as claimed in claim 3, wherein the step of deriving phase and amplitude values comprises a step of offsetting the calculating phase and amplitude values so as to substantially eliminate trajectories proximal to an origin.

8. [Original] A method as claimed in claim 3, wherein the step of scaling the calculated phase and amplitude values comprises a step of limiting the amplitude S to values of one or lower.

9. [Currently Amended] A method as claimed in claim 1, wherein the stream of successive digital sample values ~~representative of a desired optical E field~~ comprises a stream of respective In-Phase (I) and Quadrature (Q) sample values generated on the basis of an input data stream x(t).

10. [Previously Presented] A method as claimed in claim 9, wherein the In-Phase (I) and Quadrature (Q) sample values are generated by filtering the input data stream x(t) using a compensation function C(t) which compensates impairments of an optical communications link.

11. [Currently Amended] A system for modulating the E-field of an optical carrier signal, the system comprising:

a Mach-Zehnder (MZ) modulator having a pair of independently controllable branches;

a complex driver for deriving a pair of independent branch drive signals $V_L(t)$ and $V_R(t)$ based on a stream of successive digital sample values representative of In-Phase and Quadrature components of a desired optical E-field; and

wherein each branch of the MZ modulator is driven with a respective one of the independent branch drive signals.

12. [Currently Amended] A system as claimed in claim 11, wherein the complex driver comprises:

a digital filter for generating the stream of successive digital sample values ~~representative of a desired optical E-field~~, based on an input data stream x(t);

a non-linear compensator for computing respective drive signal values $V_L(n)$ and $V_R(n)$ based on the stream of successive sample values generated by the digital filter; and

a respective Digital-to-Analog converter for generating each of the drive signals $V_L(t)$ and $V_R(t)$ based on a corresponding one of the drive signal values $V_L(n)$ and $V_R(n)$.

13. [Currently Amended] A system as claimed in claim 12, wherein the stream of successive digital sample values ~~representative of a desired optical E-field~~ generated

by the digital filter comprises a stream of respective In-Phase (I) and Quadrature (Q) sample values generated on the basis of the input data stream x(t).

14. [Previously Presented] A system as claimed in claim 13, wherein the digital filter is adapted to generate the In-Phase (I) and Quadrature (Q) sample values by filtering the input data stream x(t) using a compensation function C(t) which compensates impairments of an optical communications link.

15. [Currently Amended] A system as claimed in claim 12, wherein the non-linear compensator is adapted to:

derive respective phase and amplitude signal component values $V_{\phi}(n)$ and $V_S(n)$ based on the stream of successive sample values generated by the digital filter; and

calculate the drive signal values in accordance with:

$V_L(t) = V_{\phi}(t) + V_S(t)$ and

$V_R(t) = V_{\phi}(t) - V_S(t)$.